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Greener Spectrum

By Thomas Kidd - January-March 2010

While the range between 540 – 610 in terahertz (THz) is (literally) the "green" portion of the electromagnetic spectrum, that isn't what we are going to discuss here. This article introduces the concept of the electromagnetic spectrum as a critical resource in the study of climate change. The Department of the Navy electromagnetic spectrum community supports many different radio and telecommunication technologies including equipment for weather and climate change monitoring, prediction, detection and mitigation in the event of hurricanes, typhoons, thunderstorms, earthquakes, tsunamis, man-made disasters, and more.

During his visit to the International Telecommunication Union (ITU) headquarters in June 2007, the United Nations Secretary-General, Mr. Ban Ki-moon, remarked that the "International Telecommunication Union is one of the most important stakeholders in terms of climate change." He also described climate change as the "moral challenge of our generation."

The United States was one of 120 countries to develop a new digital broadcasting plan at the 2006 ITU Regional Radiocommunication Conference. The plan envisages significant reduction (by almost 10 times) in transmitter power and a reduction in the number of transmitters (due to the possibility of transmitting several television and sound programs on one channel) in the 120 participating countries. Such high-level policies may not be considered in the front lines of climate change, but taking into account that there are roughly 100,000 transmitters in these 120 countries with power capacity of up to 100-150 kilowatts each, and most of them operating 24 hours a day, the energy savings will be significant!

Department of the Navy members of the U.S. delegation to the ITU assure the department's technological advances are considered in international treaties on radio regulations. The DON spectrum team has been a key member of the ITU study group that developed the "Land Mobile Handbook (including Wireless Access) - Volume 4: Intelligent Transport Systems." This handbook describes the use of radio technologies for minimizing transportation distances and costs that will also have a positive effect on the environment. It also pushes cutting-edge technology by introducing the use of vehicles as environmental monitoring tools to measure air temperature, humidity and precipitation by sending data through wireless links for weather forecasting and climate control.

Meeting every four years, the World Radiocommunication Conferences (WRC) analyze spectrum requirements. They also allocate spectrum for radiocommunication systems and radio-based applications employed for environmental and climate monitoring. Decisions made by the WRC provide support for the development and operation of systems involved in weather and disaster prediction, detection and relief. This includes weather satellites that track the progress of hurricanes and typhoons; weather radars for tracking tornadoes, thunderstorms, the effluent from volcanoes and major forest fires; and radio-based meteorological aid systems that collect and process weather data. International radio regulations facilitate the successful operations of diverse radiocommunication systems (satellite and terrestrial) used for disseminating information concerning natural and man-made disasters.

The WRC and Radiocommunication Assembly 2007 adopted a number of resolutions on studies related to remote sensing, which is a vital component in the science of climate change. They included a recommendation on radiocommunication systems and radio-based applications operating in the Earth Exploration Satellite, and meteorological aids and meteorological satellite services, which provide most of the data for the Global Observing System and Global Climate Observing System.

Also in 2007, the ITU, in cooperation with the World Meteorological Organization, produced a handbook on the "Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction." It provides information on the development and proper use of radiocommunication systems and radio-based technologies for environmental observation, climate control, weather forecasting, and natural and man-made disaster prediction, detection and mitigation.

DON members of the U.S. delegation to WRC 2007 were instrumental in the adoption of a resolution

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requesting the establishment of a database of available frequencies for use in emergency situations.

This resolution also urges administrations to provide relevant up-to-date information concerning their national frequency allocations and spectrum management practices for emergency and disaster relief radiocommunication operations.

Radiocommunication Assembly 2007 also approved resolutions instructing all ITU radiocommunication sector study groups to carry out studies on the use of radiocommunication in disaster prediction, detection, response, mitigation and relief. In many cases, when disaster strikes, the "wired" telecommunication infrastructure is significantly or completely destroyed, and only radiocommunication services can be employed for disaster relief operations.

The study groups have developed recommendations, reports and handbooks related to the use of radiocommunication for the mitigation of the negative effects of climate change and natural and man-made disasters. Mitigation of the negative effects of climate change is another important area of the ITU Radiocommunication sector activities.

In April 2009, the DON Chief Information Officer, along with the Assistant Secretary of the Navy for Research, Development and Acquisition and the Assistant Secretary of the Navy for Installations and Environment, signed the "Department of the Navy Strategy for Green IT Electronic Stewardship and Energy Savings." Although the relationship of "green IT" and spectrum may be new to some, the DON spectrum team has been at the forefront of the green movement. The team continues its advocacy for the implementation of innovative technology while always keeping our limited spectrum and natural resources in mind.

TAGS: [Spectrum](#), [Telecommunications](#)

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